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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,023	12/08/2005	Sun-Uk Kim	LPP20053249US	1005

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EXAMINER	
SNELTING, ERIN LYNN	
ART UNIT	PAPER NUMBER
1791	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/560,023	KIM ET AL.	
	Examiner	Art Unit	
	Erin Snelting	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,6,7 and 9-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6,7 and 9-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07-13-2010 has been entered. Claims 3, 5, and 8 are canceled, and new claims 11 and 12 are offered for consideration.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 2, 4, 6, 7, and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang '129 (US 5,650,129) in view of Nogues '980 (US 5,076,980) and Duraiswami '873 (US 6,616,873 B1).

5. Regarding claim 1, Kang '129 teaches :

a. heat-treating a silica gel by increasing its temperature to 1050 to 1200°C ("Silica gel particles…heated…up to 1100°C", column 3, lines 1-7)

b. maintaining the temperature for a predetermined time ("The temperature of 1100° was maintained for one hour", column 3, lines 7-8).

Kang '129 is silent regarding a temperature increasing speed of 5 to 90°C per minute. In analogous art of silica gel processing, Nogues '980 teaches temperature increasing speeds of 5 to 90°C per minute (column 6, lines 41-46; column 7, lines 4-9; column 7, lines 16-21 – wherein 500°C per = 8.3°C per minute), wherein the heat-treating speed of Nogues '980 is merely a known alternative leading to substantially the same result of heat-treating the silica gel.

Kang is silent regarding the heat-treating being performed in a rotary tube furnace. In analogous art of forming porous ceramic spheres, Duraiswami '873 teaches performing heat-treating in a rotary tube furnace (column 4, line 66-column 5, line 1; column 8, lines 30-63) for the benefit of optimizing physical properties of the resulting spheres (see Table 9, column 8; column 8, lines 30-63).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Kang '129 with the temperature increasing speed of Nogues '980 as a known alternative leading to substantially the same result of heat-

treating the silica gel, and with the heat-treating in a rotary tube furnace of Duraiswami '873 for the benefit of optimizing physical properties of the resulting spheres.

6. Regarding claim 2, Kang '129 is silent regarding pore size and pore volume of the silica gel. However, Kang '129 suggests that the physical properties of the silica gel are result effective variables because they may be selected in order to optimize size, shape, and microstructure of the subsequently formed silica spheres (see column 1, lines 28-31). It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980). Further, Nogues '980 teaches that pore structure is the result of various processing variables during gel production (column 3, lines 18-22; column 4, lines 37-51; column 5, lines 11-24; Fig. 1), such that the resulting gel structure is suitable for the desired subsequent heat-treating densification (column 6, line 61-column 7, line 3; Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Kang '129, Nogues '980, and Duraiswami '873 by selecting pore size and pore volume of the silica gel for the benefit of optimizing size, shape, microstructure, and densification of the subsequently formed silica spheres.

7. Regarding claim 4, Kang '129 is silent regarding the heat-treating being performed at an average temperature elevating speed ranging from 10°C to 70°C per minute. Nogues '980 teaches that average temperature elevating speed of heat-treating is a result effective variable because it may be altered in order to optimize densification of the gel (column 6, lines 41-63; column 7, lines 4-21). Please see In re

Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Kang '129, Nogues '980, and Duraiswami '873 by optimizing the average temperature elevating speed of heat-treating, as suggested by Nogues '980, for the benefit of optimizing densification of the gel.

8. Regarding claim 10, Kang '129 is silent regarding filling density of the porous silica sphere. However, the claimed property is a result of the claimed method rather than a positive active step. It has been held that where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). Thus, one of ordinary skill in the art at the time of the invention would reasonably expect the product of the method of Kang '129, Nogues '980, and Duraiswami '873 as described for claim 1 above to be identical or substantially identical to the product as claimed.

9. Regarding claim 6, Kang '129 teaches a heat treatment process, wherein silica gel is subjected to a heat-treatment at 1050 to 1200°C ("Silica gel particles…heated…up to 1100°C", column 3, lines 1-7). Kang '129 is silent regarding a first heat-treatment and regarding the heat-treatments being performed in rotary tube furnaces.

In analogous art of silica gel processing, Nogues '980 teaches a heat treatment process wherein a silica gel is subjected to a first heat-treatment at 400 to 900°C and is

subjected to a second heat-treatment at 1050 to 1200°C (Example 1 – column 8, lines 54-65 and column 9, lines 36-39) for the benefit of controlling densification of the gel (column 6, lines 61-63; Fig. 1).

Nogues '980 further teaches the heat-treatment process is performed using at least two furnaces ("The diffusion boat was then placed in a furnace", column 8, lines 49-51; "The partially densified gel…was then placed directly in the center of a controlled atmosphere furnace", column 9, lines 1-5) for the benefit of providing controlled heat-treating atmospheres as needed for each step (column 8, lines 51-53; column 9, lines 5-43).

Nogues '980 is silent regarding the heat-treatments being performed in rotary tube furnaces and in the first heat-treatment the temperature in a first rotary tube furnace being increased at an average speed of 35 to 70°C per minute. However, Nogues '980 teaches that average temperature elevating speed of heat-treating is a result effective variable because it may be altered in order to optimize densification of the gel (column 6, lines 41-63; column 7, lines 4-21; see also Examples). Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980).

In analogous art of forming porous ceramic spheres, Duraiswami '873 teaches performing heat-treating in a rotary tube furnace (column 4, line 66-column 5, line 1; column 8, lines 30-63) for the benefit of optimizing physical properties of the resulting spheres (see Table 9, column 8; column 8, lines 30-63).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Kang '129 with the teachings of Nogues '980 and

Duraiswami ‘873 for the benefit of controlling and optimizing densification of the gel, providing controlled heat-treating atmospheres, and optimizing physical properties of the resulting spheres.

10. Regarding claim 7, Kang ‘129 further teaches the second heat treatment is performed for 20 to 60 minutes (column 3, lines 7-8). Kang ‘129 is silent regarding the first heat treatment. Nogues ‘980 teaches first heat treatment as described for claim 6 above. Nogues ‘980 further teaches that the heat treatment steps are performed for 20 to 60 minutes (column 6, lines 52-55), and further that heat treating time is a result effective variable because it may be altered in order to optimize densification of the gel (column 6, lines 61-63). Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Kang ‘129, Nogues ‘980, and Duraiswami ‘873 by optimizing the heat treating times, as suggested by Nogues ‘980, for the benefit of optimizing densification of the gel.

11. Regarding claim 9, Kang ‘129 teaches the silica gel is subjected to a heat treatment at a temperature of 1100 to 1150°C (column 3, lines 1-7). Kang ‘129 is silent regarding a rotary tube furnace. Nogues '980 teaches a second furnace for a second heat treatment, as described for claim 6 above, for the benefit of providing controlled heat-treating atmospheres as needed for each step (see column 8, lines 51-53 and column 9, lines 5-43). Duraiswami ‘873 teaches performing heat-treating in a rotary tube furnace, as described for claim 6 above (column 4, line 66-column 5, line 1; column 8, lines 30-63) for the benefit of optimizing physical properties of the resulting spheres

(see Table 9, column 8; column 8, lines 30-63). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Kang '129 with the second furnace of Nogues '980 and the rotary tube furnace of Duraiswami '873 for the benefit of providing controlled heat-treating atmosphere and optimizing physical properties of the resulting spheres.

12. Regarding claims 11 and 12, Kang '129 teaches performing a heat-treatment on a silica gel for n minutes, wherein the heat-treatment includes a temperature increasing stage and a temperature maintaining stage, wherein during the temperature maintaining stage the silica gel is maintained at between about 1050°C and about 1200°C ("Silica gel particles…heated…up to 1100°C", column 3, lines 1-7). Kang '129 is silent regarding the duration of each stage, the temperature increasing rate, and performing the heat-treatment in a rotary tube furnace.

In analogous art of silica gel processing, Nogues '980 teaches temperature increasing rates of 5 to 70°C per minute (column 6, lines 41-46; column 7, lines 4-9; column 7, lines 16-21 – wherein 500°C per = 8.3°C per minute), wherein the heat-treating rate of Nogues '980 is merely a known alternative leading to substantially the same result of heat-treating the silica gel. Regarding the heat-treatment duration, Nogues '980 teaches that heat-treatment duration is a result effective variable because it may be altered in order to optimize densification of the gel (column 6, lines 61-63). Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980).

In analogous art of forming porous ceramic spheres, Duraiswami '873 teaches performing heat-treatment in a rotary tube furnace (column 4, line 66-column 5, line 1;

column 8, lines 30-63) for the benefit of optimizing physical properties of the resulting spheres (see Table 9, column 8; column 8, lines 30-63).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Kang '129 with the temperature increasing rates of Nogues '980 as a known alternative leading to substantially the same result of heat-treating the silica gel, and with the heat-treating in a rotary tube furnace of Duraiswami '873 for the benefit of optimizing physical properties of the resulting spheres, and further by optimizing the heat-treatment duration for the benefit of optimizing densification of the gel, as suggested by Nogues '980.

Response to Arguments

13. The rejections of claims 6, 7, and 9 under 35 USC § 112 of the previous Office action are withdrawn.

14. Applicant's arguments filed 07-13-2010 have been fully considered but they are not persuasive.

Arguments are summarized as follows: The experimental results provided in the Kim Declaration show that when the slow temperature increase of Kang '129 is used, the result is either a failure to foam or over-foaming.

Response: The evidence provided in the Kim Declaration is not reasonably commensurate in scope with the claimed invention because the experiments were not conducted in a rotary tube furnace as claimed. Additionally, no experiments are provided using the claimed heating rates to show any differences with Kang '129. See,

e.g., *In re Kulling*, 897 F.2d 1147, 1149, 14 USPQ2d 1056, 1058 (Fed. Cir. 1990); *In re Grasselli,* 713 F.2d 731, 743, 218 USPQ 769, 777 (Fed. Cir. 1983).

15. Applicant's remaining arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin Snelting whose telephone number is (571) 272-7169. The examiner can normally be reached on Monday to Friday 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Daniels can be reached on (571) 272-2450. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

els

/Matthew J. Daniels/
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